unpatentable over Scheps, U.S. Patent No. 6,404,785 in view of Muller, et al., U.S. Patent No. 5,963,575.

Applicants respectfully traverse.

Scheps discloses a wave-guide laser pumping a sum frequency generator (120), (see column 3, lines 15-20, and column 4, lines 5-10). A sum frequency generator is not a laser since it does not utilize amplified stimulated emission, but is a non-linear optic device that converts input radiation of two given wavelengths into output radiation of a different wavelength. In contrast, the present invention claims 1 and 25 claim a guided-wave laser that pumps a solid-state crystal laser device. The operation of the crystal laser device is completely different from a non-linear optic frequency conversion device. In the present invention the guided-wave laser is the power source that produces stimulated emission in the solid-state crystal laser device, whereas in the Scheps non-linear conversion device there is no stimulated emission, but instead a non-linear conversion process. Thus, Scheps fails to disclose or suggest applicants claimed invention, comprising three lasers in series, as claimed in claims 1-4, 16-28 and 40-48.

Similarly, the fiber-optic element in Muller, as shown in Fig 1a, element 1.2, is not a guided-wave laser that pumps the crystal laser, but is instead a fiber-optic resonator extension (see column 2, lines 61-62, and column 4, lines 58-61). The fiber-optic resonator extension is used to produce variable output pulse duration in the crystal laser depending on the length of the fiber extension in the resonator (see column 3, lines 21-24, and column 4, lines 58-61). The fiber-optic extension is not a pump (power) source for the crystal laser, but is instead an extension of the crystal laser resonator. In particular, the pump source for the Muller patent is a flash lamp (column 3, lines 1-4). In contrast, the present invention claims 1 and 25 claim a guided-wave laser that pumps the crystal laser; that is, the guided-wave laser is the pump

(power) source for the crystal laser. Thus Muller also fails to disclose or suggest applicants claimed invention, as claimed in claims 1-4, 16-28 and 40-48. Nor would any combination of Scheps and Muller disclose or suggest the invention as claimed in claims 1 and 25, since no combination would contain three laser devices in series.

On page 3 of the PTO communication, the Examiner stated "Muller et al disclose an Er-doped solid-state crystal laser (2.1) being pumped by the wave-guide laser (112)". This is incorrect, since Muller does not contain a wave-guide laser. Instead, the wave-guide laser (112) is in the Scheps patent.

As discussed above, the Muller patent discusses a laser crystal that is pumped by a flash lamp, as shown in column 3, lines 1-4. In a flash lamp pumped laser, a multiplicity of energy states is pumped by the broad range, several hundred nm, of pumping wavelengths emitted by the flash lamp. In particular, while the flash lamp emission wavelengths extend over several hundred nm, a single energy state extends over only a few tens of nm. In the present invention, as claimed in claim 1, step (b) and the middle element of claim 25, the pump source is a guided-wave laser, and guided wave lasers emit a narrow range of wavelengths which are input to the laser of the third stage (step (c) of claim 1 or the last element of claim 25). Claim 1, step (c), or the third element of claim 25, claims an upper-state pumped Er-doped laser. That is, a single energy state in the Er-doped crystal is pumped by the guided-wave laser. A flash lamp, such as described in Muller column 3, lines 1-4, can not upper-state pump the Er-doped crystal laser, because the flash lamp pumps a multiplicity of energy states. The pumping of many energy states introduces problems into the operation of the Er-doped crystal laser. In particular, problems of radiative decay, multiphonon decay, and upconversion losses caused by interactions among the multiplicity of pumped energy states.

The Examiner rejected claims 5-15 and 29-39 under 35 U.S.C. 103(a) as being unpatentable over Scheps in view of Muller, et al. and further in view of Anthon, U.S. Patent 5,644,589.

Applicants respectfully traverse.

As discussed above, Scheps and Muller do not disclose or suggest the claims upon which claims 5-15 and 29-39 depend. Further, Anton discusses an Yb,Er-doped waveguide laser operating in the 800 nm to 1100 nm wavelength range. It is not obvious from a device operating at these wavelengths how to operate an Yb,Er-doped waveguide laser in the 1450 nm to 1540 nm wavelength range, because emission in the 800 nm to 1100 nm wavelength range results from operation on a different transition between energy states than emission in the 1450 nm to 1540 nm wavelength range. Operation of lasers on different transitions between energy states represent completely different lasers, with many differences in appropriate pumping method and relevant energy transfer mechanisms. Therefore, claims 5-15 and 29-39 are not anticipated by the combination of Scheps, Muller, and Anthon.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone James R. Young, Applicants' Attorney at 512-869-2606 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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